Time Use by Rural School Going Adolescents and Its Impact- A Prospective Cohort Study

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Abstract: In this article physical activity, screen time, and academic work are studied as mediator among school children in India. Participants were 208 school children aged 13 – 16 years from Pondicherry, India. They were sampled from private schools. physical activity and screen time, spending more time on academic work. screen time was negatively related to sleep duration, academic work was gaining weight. Time spent by them on academics, skill development activities and leisure are worthwhile. With the increase in the prevalence of obesity among the adolescents Physical activity was significant mediator. In India, academic work is a strong predictor of a lower sleep duration among children and adolescents.

I. Introduction

Adolescents contribute to 19.6% of the Indian population. Screen time may have negative health effects by compromising the time spent on developmental activities. Time spent by them on academics, skill development activities and leisure are worthwhile. With the increase in the prevalence of obesity among the adolescents worldwide, the same in Iran has been doubled during the past two decades (1,2). Childhood obesity is linked to diabetes, asthma, and sleep disorders, and obesity in adults is linked to a higher rate of mortality. Longitudinal studies have shown that overweight children are more likely to become overweight adults (3). Overweight in adults will increase the risk of cardiovascular disease, hypertension, gallbladder disease, diabetes mellitus, atherosclerosis, gout, arthritis, and somemalignancies (4). Most of the studies conducted on different adolescent population groups have found a relationship between adiposity and some risk factors associated with nutritional, physical and socioeconomic factors. Some of the identified risk factors are: increase in the consumption of fat (5,6), high consumption of energy-rich foods and alcohol (7,8), low intake of milk and milk products (9), unhealthy dietary patterns (5,7,10), skipping the breakfast (5,8), having been formula-fed instead of being breastfed in infancy, watching TV, physical inactivity (7,8), insufficient sleep duration (7), high BMI in parents, and high birthweight. However, the mechanisms through which TV and using mobile phones others viewing affects overweight remain controversial. It has been proposed screen time increases overweight because, increase screen time, people spend less time on performing PA and, at the same time, they increase their consumption of obesogenic foods. In the present study, we tried to investigate screen time, the level of PA, and the consumption of obesogenic foods to find any possible relationship with overweight and obesity. To find out a practical solution among adolescents in Pondicherry, first we have to know the severity of the problem and the risk factors affecting it. The increasing prevalence of OAO (overweight and obesity) among adolescents has necessitated studying a range of related risk factors simultaneously. Overweight is the result of genetic and environmental factors. The tripled increase of overweight in the last 3 decades implicates that environmental factors have been more influential compared to genetic factors. Identifying the major cause of obesity from among all the environmental factors in any population will be interesting. Therefore, we aimed to investigate the prevalence of OAO and its nutritional, physical, social and economic risk factors in a representative sample of male and female students aged 13-16 years in Pondicherry.

AIM

To determine time use by rural school going adolescents and its impact

OBJECTIVES

To assess the time spent by adolescents of age 13 to 16 years for
a. Screen time (mobile usage and television viewing)

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b. interacting with parents and siblings
c. reading and doing homework
d. engaging in other leisure activities

II. Materials And Methods

I. STUDY DESIGN: Cohort study
II. STUDY AREA: Randomly selected rural school at Puducherry.
III. STUDY POPULATION: Mid-adolescents (14-16 years) a.i.e two classes of 9th standard students and one class of 11th standard students
IV. SAMPLE SIZE: 208
V. Study was done on 1st Sunday and Monday of January, 2019

III. Methodology

a. Written informed consent will be obtained from all childrens before enrollment in the study
b. Preformed proforma was given to all childrens
c. Daily activities of the children was noted down round the clock in the proforma
d. Filled proforma was collected on the next day
e. Similar proforma was given next day and was noted down in the proforma
f. All details regarding the study will be recorded according to the pre designed proforma
g. All data were collected, analyzed and tabulated
h. Results and observations were mentioned below

IV. Observations

Table 1: Prevalence of overweight and obesity amongst the students

<table>
<thead>
<tr>
<th></th>
<th>Total number</th>
<th>Over weight</th>
<th>Obesity</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>112</td>
<td>16(7.69%</td>
<td>11(5.29%</td>
<td>0.8336</td>
</tr>
<tr>
<td>Girls</td>
<td>96</td>
<td>10(4.81%)</td>
<td>6(2.88%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>208</td>
<td>26(12.5%)</td>
<td>17(8.17%)</td>
<td></td>
</tr>
</tbody>
</table>

In table 1 the total sample was 208 in 112 boys and 96 girls, overall the prevalence of overweight and obesity among the students were 12.5% and 4.08%. The prevalence of overweight and obesity among boys were 7.69% and 5.29%. The prevalence of overweight and obesity amongst girls were 4.81% and 2.88%, were no significant gender differences between the percentages of overweight or obese individuals (t = 0.078, p = 0.834).

Table 2. Descriptive data \( \chi^2 \) for the physical characteristics and types of screen time activities according to gender.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Boys (n=112)</th>
<th>Girls (n=96)</th>
<th>T</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Mean 12.62</td>
<td>Mean 12.74</td>
<td>0.269</td>
<td>0.843</td>
</tr>
<tr>
<td>Min/d television viewing</td>
<td>SD 0.38</td>
<td>SD 0.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min/d video game usage</td>
<td>Mean 42.85</td>
<td>Mean 32.96</td>
<td>1.732</td>
<td>0.0312</td>
</tr>
<tr>
<td>Min/d Computer usage</td>
<td>SD 48.69</td>
<td>SD 29.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min/d video game usage</td>
<td>Mean 21.05</td>
<td>Mean 76.82</td>
<td>10.342</td>
<td>0.012*</td>
</tr>
<tr>
<td>Min/d Computer usage</td>
<td>SD 51.59</td>
<td>SD 13.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min/d Computer usage</td>
<td>Mean 20.74</td>
<td>Mean 21.54</td>
<td>0.1488</td>
<td>0.759</td>
</tr>
<tr>
<td>Min/d Computer usage</td>
<td>SD 46.28</td>
<td>SD 27.13</td>
<td></td>
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Prior to analysing the findings and to ensure that the data from the two mixed-gender schools were representative, independent sample t-tests confirmed that there were significant school-type differences in MVPA, screen time activities and BMI. The descriptive data of the physical characteristics according to gender and the type of screen time activities of the sample are presented in Table 2. The mean age of the participants was 12.62± 0.38 of boys and 12.74 ± 0.64 of girls classified as overweight and/or obese. There were no significant gender differences between the percentages of overweight or obese individuals (t = 0.269, p = 0.834). In relation to the type of screen time activities, independent sample t-tests confirmed that there was a significant gender difference with boys accumulating more minutes (Mean = 21.05 ± 51.59) of daily video game usage compared to girls (Mean = 76.82 ± 13.62; t = 10.342, p = 0.012).

Table 3: Coefficients for correlation among types of screen time activities, PA and BMI scores according to gender.

<table>
<thead>
<tr>
<th>Correlation Variables</th>
<th>Daily Television</th>
<th>Daily video Games</th>
<th>Daily Computer usage</th>
<th>Overall Screen Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate PA p/day</td>
<td>0.025</td>
<td>-0.201</td>
<td>0.034</td>
<td>-0.024</td>
</tr>
<tr>
<td>Vigorous PA p/day</td>
<td>-0.059</td>
<td>-0.221</td>
<td>-0.101</td>
<td>-0.119</td>
</tr>
</tbody>
</table>
Table 3 shows the correlations among types of screen time activities, overall screen time, PA and BMI by gender. Male BMI scores showed a weak but significant positive correlation with playing computer games only (r = 0.241, p < 0.05). Among girls, time spent in MVPA showed a significant medium negative correlation with daily television viewing only (r = 0.357, p < 0.05).

V. Results

- Majority of the waking time per week
  - 50% was spent on mobiles, computers and watching television – SCREEN TIME
- The average sleep time: 8 hours/day
- Almost equal to average screen time which was 8 hours/day.
- The time spent by the adolescents during weekends on screen time, was 2.6 times higher as compared to the weekdays.
- Almost 20 hours
- Less time was spent on reading other than textbooks, extracurricular activities and playing.
- 39 out of 208 were overweight: 19.2%

VI. Discussion

This study found relationship between OAO and the nutritional factors. This might be because the researchers questionnaire items to achieve validity and reliability. That is, the researchers sufficed to food items which are more likely to be consumed during screen time. Consequently, the FFQ contained only 6 items concerning obesogenic foods, and this may have been the cause of not arriving at insignificant results concerning the relationship between OAO and nutritional factors. Other studies conducted on different populations, which had examined more nutritional factors, showed that OAO has a direct relationship with consumption of unhealthy dietary patterns (5), high-fat milk and milk products, refined grains (3), fatty meats (3), fat (5,6), refined carbohydrates (6), drinks containing sugar (6), and having been formula-fed in infancy (1). This study had limitations in assessment of nutritional factors but found that the factors that were examined had no decisive role in OAO; so, conducting specialized studies in this field is necessary.

Physical activity factors: Results of multiple logistic regression analysis revealed that, contrary to low PA and obesogenic foods, screen time was a strong risk factor for OAO. Two important mechanisms concerning the effect of screen time on obesity have been proposed. The first proposal states that time spent on screen time reduces the timespent on performing PA. The results of this study, which are consistent with the results of study conducted showed that screen time, independent of PA, increased the risk of OAO. The second proposal states that screen time provides time to consume more obesogenic foods. The obesogenic foods under study in the present investigation were those that are easily available and have high calories, such as chips, fried potatoes, sausages, bologna, hamburgers, pizzas, Tahdig, butter, and nuts. This study showed that the amount of obesogenic foods consumption was not related to the length of time the adolescents spent on screen time. It means screen time affects OAO, independent of obesogenic foods. Probably, screen time acts through mechanisms other than reducing the expenditure of energy (1, 4, 7) and increasing the consumption of obesogenic foods. These mechanisms probably include the effects of food advertisements on dietary patterns (3), reduction of metabolic rate to lower than that in rest time (9), circulating cortisol elevation due to excitement (9), and disruption in the circadian rhythm (1). The findings of the present study suggest that screen time, PA or obesogenic foods, was associated with OAO in adolescents. Students in pondicherry spent the more amount of time on consumed amount of obesogenic foods than PA. However, screen time attributed most to the variance of OAO. To control overweight among children, parents should reduce the time their children spend on screen time as much as possible. Perhaps, it would have been better if we had included more economic factors to find their net effect on the frequency of OAO. The strengths of this study lies in its population-based approach and large sample, which resulted in a great reduction of random errors. Another advantage was the precise measurement of weight and height. In addition, this study was highly valid because of its large sample size, valid and reliable questionnaire, relatively brief questionnaire, and extraction of the net effect of each factor under study.
VII. Conclusion

In this study, significant association p value- 0.01 (<0.05) was observed between screen time and sleeping, playing and diet pattern

◦ Since children were physically inactive during this period
◦ And most junk foods along with extra calorie foods were consumed during this period

References